UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,216	10/15/2003	Hendrik F. Hamann	YOR920030431US1	5867

7590 12/16/2008

Moser, Patterson & Sheridan
Suite 100
595 Shrewsbury Avenue
Shrewsbury, NJ 07702

EXAMINER	
HUGHES, JAMES P	
ART UNIT	**PAPER NUMBER**
2883	
MAIL DATE	**DELIVERY MODE**
12/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HENDRIK F. HAMANN, SHAREE J. MCNAB, and
YURII A. VLASOV

Appeal 2008-5466
Application 10/686,216
Technology Center 2800

Decided: December 16, 2008

Before BRADLEY R. GARRIS, ROMULO H. DELMENDO, and
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) (2002) from the Examiner's rejection of claims 1-36. (Examiner's Answer entered April 1, 2008, hereinafter "Ans."). We have jurisdiction pursuant to 35 U.S.C. § 6(b) (2002).

We AFFIRM.

THE INVENTION

Appellants' claimed invention is directed to an apparatus comprising a photonic crystal having a layer where light is guided or confined and at least one lateral electrical contact coupled to the layer of photonic crystal. (Spec. [0020]; Figs. 1 and 2). The at least one lateral electrical contact is positioned to provide electrical control along substantially an entire length of the layer of photonic crystal. (*See* Figs. 1 and 2). Appellants' claimed invention is also directed to a method for applying electrical control to the photonic crystal structure by applying a voltage to the at least one lateral electrical contact. (Spec. [0025]). Appellants also claim a method for thermo-optic control of the photonic crystal structure by heating and cooling a substrate of the photonic crystal. (Spec. [0029]).

Claims 1, 21, and 32, reproduced below, are representative of the subject matter on appeal.

> 1. An apparatus comprising:
>
> a photonic crystal having a layer where light is guided or is confined; and
>
> at least one lateral electrical contact coupled to said layer of the photonic crystal, said at least one lateral electrical contact positioned to provide electrical control along substantially an entire length of said layer.

21. A method for applying electrical control to a photonic crystal structure comprising:

providing a photonic crystal having a layer where light is guided;

coupling at least one lateral electrical contact to said layer of the photonic crystal, said at least one lateral electrical contact positioned to provide electrical control along substantially an entire length of said layer; and

applying a voltage to the at least one lateral electrical contact.

32. A method for thermo-optic control of a photonic crystal structure comprising:

providing a photonic crystal comprising:

a substrate;

a plurality of apertures formed through the substrate; and

a waveguide formed through the plurality of apertures, substantially proximate to the middle of the substrate;

forming a first lateral electrical contact proximate to the waveguide, the first lateral electrical contact being optically isolated from the waveguide by the plurality of apertures;

forming a second lateral electrical contact proximate to the waveguide, the second lateral electrical contact being optically isolated from the waveguide by the plurality of apertures, said first lateral electrical contact and said second lateral electrical contact being positioned to provide electrical control along substantially an entire length of said layer; and sequentially heating and cooling the substrate.

THE REJECTIONS

The following prior art and application claims are relied upon by the Examiner in rejecting the claims on appeal:

Shirane	US 2002/0146196 A1	Oct. 10, 2002
Baba	6,522,448 B2	Feb. 18, 2003
Hamann	10/755,816	Jan. 12, 2004[1]
Montgomery	6,845,198 B2	Jan. 18, 2005 (Mar. 8, 2004)
Hamann	11/122,152	May 4, 2005

The following rejections are on appeal:

The Examiner rejected claims 1 and 21 under 35 U.S.C. § 102(b) as being anticipated by or alternatively, under 35 U.S.C. § 103(a) as being unpatentable over Shirane.

The Examiner rejected claims 1-15 and 21-31 under 35 U.S.C. § 103(a) as being unpatentable over Shirane.

The Examiner rejected claims 16-20 as being unpatentable over Shirane in view of Baba.

The Examiner rejected claims 32-36 as being unpatentable over Shirane in view of Montgomery.

The Examiner rejected claims 1-36 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of Application No. 10/755,816 and claims 1-19 of Application No. 11/122,152.

---

[1] Now U.S. Patent 7,068,865 B2, Jun. 27, 2006.

The Examiner found that Shirane describes a photonic crystal having lateral electrical contacts. (Ans. 4 and 5). The Examiner found that whether Shirane anticipates claims 1 and 21 or renders these and other claims obvious depends on the interpretation of the claim limitation "to provide electrical control along substantially an entire length of said layer." (Ans. 5). The Examiner found that when "substantially an entire length of said layer" is interpreted to apply only to the electrodes in the waveguide layer, Shirane anticipates claims 1 and 21. (Ans. 5). The Examiner found that when "substantially an entire length of said layer" is interpreted to mean that the electrical contacts extend along the entire waveguide layer; Shirane does not explicitly teach this limitation. (Ans. 5). The Examiner concluded that it would have been obvious to extend the electrodes of Shirane to cover the entire length of the waveguide layer to provide control over a larger region of the waveguide and greater assurance that light will not pass through the waveguide when the switch is turned off. (Ans. 5 and 6).

Appellants contend that Shirane fails to teach, show, or suggest positioning lateral electrical contacts to provide electrical control along substantially an entire length of the waveguide layer. (Appeal Brief filed November 10, 2006, hereinafter "Br.," 4). Appellants argue that Shirane provides only regional control along localized portions of the waveguide layer. (Br. 5). Appellants contend that the Examiner's interpretation of "an entire length of said layer" is incorrect and "an entire length of said layer" is not limited to certain sections of the waveguide layer. (Br. 6). Appellants argue that Shirane does not provide any motivation to modify the length of the electrical contacts, and that the Examiner relies on a hindsight rationale to reject the claims. (Br. 7)

ISSUES

Based on the contentions of the Appellants and the Examiner, the issues are:

Did the Examiner err in interpreting the claim limitation "provide electrical control to substantially an entire length of said layer?"

Did the Examiner err in finding that claims 1 and 21 are anticipated by Shirane?

Have Appellants shown that the Examiner erred in concluding that it would have been obvious to extend the electrodes of Shirane to substantially the entire length of the waveguide?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Appellants' Specification does not expressly define "substantially an entire length" of a layer of a photonic crystal.
2. The ordinary meaning of "substantially an entire length of said layer" refers to the entire layer, not to the electrode portions of the layer.
3. Appellants' Specification does not discuss the relationship between the length of the lateral electrical contacts and control over the entire length of the waveguide.
4. Appellants' Specification states that "those skilled in the art will appreciate that the contacts 102 may be placed anywhere on the

substrate 104 where they are sufficiently optically isolated from the waveguide region." (Spec. [0026]; Figs. 1 and 2).

5. Appellants' Specification states that "[l]ateral electrical contacts are provided that supply electrical current to the photonic crystal structure, allowing for active control over the photonic crystal properties." (Spec. [0040]).
6. Shirane teaches photonic crystals with lateral electrical contacts. ([0069], [0070]; Fig. 12).
7. Shirane states:

   > When current is injected or a reverse bias voltage is applied between the electrodes **80** and **81**, the photonic band structure of the photonic crystal around the line-defect optical waveguide changes, by which the propagation mode of the line-defect waveguide becomes to be [sic] outside the photonic band gap, whereby light can no longer propagate through the line-defect waveguide.
   > ([0072]).

8. Baba describes the use of photonic crystals in optical elements including modulators and switches. (Col. 1, ll. 13-26; col. 7, ll. 37-55).
9. Montgomery describes that dopant layers are known for providing electrical contacts in electro-optic devices. (Col. 3, l. 34 - col. 4, l. 8).

PRINCIPLES OF LAW

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 827 (1987). Analysis of whether a claim is patentable over the prior art under 35 U.S.C. § 102 begins with a determination of the scope of the claim. We "determine[] the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction 'in light of the specification as it would be interpreted by one of ordinary skill in the art.'" *Phillips v. AWH Corp.,* 415 F.3d 1303, 1316 (Fed. Cir. 2005), cert. denied 126 S. Ct. 1332 (2006) (quoting *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004)). The properly interpreted claim must then be compared with the prior art.

Regarding the determination of obviousness, the Supreme Court in *KSR* stated:

> The first error of the Court of Appeals in this case was to foreclose this reasoning by holding that courts and patent examiners should look only to the problem the patentee was trying to solve. The Court of Appeals failed to recognize that the problem motivating the patentee may be only one of many addressed by the patent's subject matter. The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art. Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

KSR Int'l Co. v. Teleflex, Inc., 127 S. Ct. 1727, 1742 (2007) (Internal citations omitted). The Court stated that "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton." *Id.* at 1742. Regarding the use of hindsight, the Court indicated that a fact finder "must be cautious of arguments reliant upon *ex post* reasoning," but went on to state that "[r]igid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *Id.* at 1742-43.

ANALYSIS

Appellants have grouped certain claims subject to each of the grounds of rejection separately. However, Appellants rely on the same arguments for each group of claims. Accordingly, we confine our discussion to appealed claim 1, which contains the claim limitations representative of the arguments made by Appellants, and address other claims only to the extent that Appellants have argued them separately pursuant to 37 C.F.R. § 41.37(c)(1)(vii) (2006).[2]

Discussion of Claim Interpretation and 35 U.S.C. § 102(b) Rejection

The Examiner erred in interpreting the claim limitation "to provide electrical control along substantially an entire length of said layer" to be limited to the electrodes disclosed in Shirane. Although Appellants have not defined "substantially an entire length" in the Specification, it is clear from the surrounding claim language that this phrase modifies the claim limitation "said layer." (FF 1 and 2). "[S]aid layer" refers to the entire layer of "a photonic crystal having a layer where light is guided or confined," not a portion of the layer. Thus, interpreting "substantially an entire length" to refer to only a portion of "said layer" is not a plausible claim interpretation. As a result, the Examiner erred in rejecting claims 1 and 21 under 35 U.S.C. § 102(b) as being anticipated by Shirane. Shirane does not teach that the electrodes extend along substantially an entire length of a layer of a photonic crystal.

---

[2] Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37 (c)(1) (vii) (2004).

35 U.S.C. § 103 Rejections

Appellants have failed to show that the Examiner erred in concluding that it would have been obvious to extend the electrodes of Shirane along substantially an entire length of a layer of a photonic crystal. Shirane provides evidence that the propagation of light may be controlled between the electrodes. (FF 7). Thus, the Examiner's common sense reasoning for extending the length of the electrodes is based on Shirane's teaching of light propagation control by the electrodes. Appellants have not sufficiently shown that the Examiner has relied on Appellants' claims or that varying the length of the electrode would be outside the ordinary creativity of one of ordinary skill in the art. Indeed, Appellants' Specification states that the electrical contacts may be placed anywhere on the substrate so as long as they are sufficiently isolated from the waveguide region. (FF 4 and 5). Appellants' Specification is also silent as to the relationship of electrode length to the electrical control of a layer of the photonic crystal. (FF 3). Therefore, the length of the electrical contacts appears to be a design choice well within the ordinary skill in the art depending on the amount of electrical control desired in a particular application. Accordingly, we affirm the § 103 rejections over Shirane alone.

We also affirm the rejections of claims 16-20 over Shirane in view of Baba and claims 32-36 over Shirane in view of Montgomery for the same reasons. Appellants' additional arguments for the separately grouped claims constitute mere allegations that the rejections are improper without reasonably specifying any error therein. Therefore, these "arguments" are unpersuasive.

Double Patenting Rejections

Appellants do not challenge the merits of the Examiner's double patenting rejections, but instead argue that the double patenting rejections were first raised in the Final Office Action, in response to which terminal disclaimers were timely filed. (Reply Brief filed April 16, 2007, 3). However, the terminal disclaimers have not been entered by the Examiner. (Ans. 11). Appellants did not petition the Examiner's refusal to enter and consider the terminal disclaimers or the timeliness of the Final Rejection during prosecution and have not presented any arguments on the merits of the Examiner's rejections. Thus, we affirm the Examiner's decisions to reject claims 1-36 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of Application No. 10/755,816 and claims 1-19 of Application No. 11/122,152. *See* MPEP §§ 706.07(c) (8th ed., Aug. 2001), 1000.02(c) (8th ed., Rev. 2, May 2004), 2272 (8th ed., Rev. 7, July 2008); 37 C.F.R. § 1.181 (2004).

CONCLUSION

The Examiner erred in interpreting "provide electrical control to substantially an entire length of said layer."

The Examiner erred in finding that claims 1 and 21 are anticipated by Shirane.

Appellants failed to demonstrate that the Examiner erred in determining that it would have been obvious to extend the electrodes of Shirane to substantially the entire length of the waveguide.

ORDER

We reverse the Examiner's decision rejecting claims 1 and 21 under 35 U.S.C. § 102(b) as being anticipated by Shirane.

We affirm the Examiner's decisions rejecting claims 1 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Shirane; claims 1-15 and 21-31 under 35 U.S.C. § 103(a) as being unpatentable over Shirane; claims 16-20 as being unpatentable over Shirane in view of Baba; and claims 32-36 as being unpatentable over Shirane in view of Montgomery.

We affirm the Examiner's decisions rejecting claims 1-36 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of Application No. 10/755,816 and claims 1-19 of Application No. 11/122,152.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(iv).

AFFIRMED

ssl

MOSER, PATTERSON & SHERIDAN
SUITE 100
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702